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(54) Title: PROPEL/REPEL DISPENSERS

(57) Abstract: A propel/repel dispenser having one or more features in combination to provide improved manufacture, assembly and use of the dispenser is described. Such features include a wide single lead thread, a "click" feature to provide sound and feel to a user so that propelling and repelling can be controlled, and a retention means involving a single slot extending from a central opening through which a screw structure passes upon assembly of the dispenser.



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PROPEL/REPEL DISPENSERS

RELATED APPLICATIONS

[0001] This application hereby claims the benefit under 35 U.S.C. § 119(e) of U.S. Provisional Application Serial No. 60/588,767, filed July 19, 2004, entitled PROPEL/REPEL DISPENSERS.

FIELD OF INVENTION

[0002] The invention is directed to propel/repel dispensers, in particular containing one or a combination of features providing for improved manufacture, assembly and consumer use. Inventive features disclosed include a single lead thread for the internal screw structure, a "click" feature which provides sound and feel to a consumer to indicate advance of the product in the dispenser upon propelling or repelling, and a single slot retention means for holding the screw structure in place in a dispenser body upon assembly.

BACKGROUND OF THE INVENTION

[0003] Stick applicators having various dispensing structures are generally known as being useful for dispensing various products including lip balms, lipsticks, deodorants, and the like. Stick applicators may take the form of, for example, a roll-on applicator for a liquid or a screw-operated push-up applicator for a non-liquid substance.

[0004] In a typical screw operated push-up applicator, material is stored within a barrel or body and is supported by an internally threaded elevator. A rotatable dispensing screw extends longitudinally inside the barrel and engages the elevator. The screw has a control knob, located at a non-dispensing end of the

barrel, that determines the elevator's position. When the knob is turned, the screw is rotated inside the barrel causing the elevator to travel longitudinally, and push the material out of an opposite (dispensing) end of the barrel.

[0005] A screw-operated push-up applicator may also have a control knob which is non-rotatably fixed within an outer container surrounding a barrel, such that upon turning the barrel itself by a collar on the opposite end has the effect of moving the elevator within the barrel. This structure is described in U.S. Patent No. 5,842,802.

[0006] In the general operation of a typical screw operated push-up applicator, a user turns the control knob causing the threaded shaft of the screw to turn, and thereby cause the elevator to travel inside the barrel with concomitant movement of the product up or down from the dispensing end of the barrel. The amount of product dispensed from or retracted into the barrel is proportionate to the extent to which the control knob is turned.

[0007] Deficiencies in existing stick applicators make them less than optimal in use. First, the amount of product dispensed is difficult to control because it is indiscriminately dispensed when the control knob is turned. Special care and attention are required to position the control knob so that a precise desired amount of product is exposed or dispensed. If too much of the product is extended, the stick can break. If too little is extended, inadequate application of the product results or repeated application is required. Second, accidental dispensing can be a problem with existing stick applicators. Since there is no stop or check on

the control knob, it is easily turned by various types of unintended contact.

[0008] Various screw operated applicators are known in the art as described for example in U.S. Patent No. 3,917,417 and U.S. Patent No. 1,950,324. They are useful for dispensing such products as lip balms, deodorants, lubricants and the like. While other stick applicator structures are known which provide for incremental dispensing, such structures are complex requiring multiple components of interrelating structures. This is expensive in terms of materials, time, and labor in assembly during the manufacturing process for dispensing lipstick from the holder.

[0009] It would be advantageous to have a screw operated stick applicator that avoids accidental dispensing of product and that allows a user to quickly and easily dispense convenient predetermined amounts of product incrementally and without resorting to careful fine tuning of the control knob, in particular which does not require complex and expensive dispensing structures, and provides an indication to the consumer of the advance of the product in the dispenser upon propelling or repelling.

SUMMARY OF INVENTION

[0010] Propel/repel containers include a dispensing body, a central screw structure including a lengthwise extending screw threaded upright member and a turn screw at a base thereof, an elevator which travels along the screw thread of the upright member to propel or repel product contained within the dispenser body, and a cap for sealing the product in the dispenser during non-use.

[0011] Conventional thread designs for screws and elevators of propel/repel dispensers consist of double,

triple or quadruple lead 6 or 8 pitch threads that require complicated high maintenance unscrewing molds for the elevators having internal threads and complicated molds for the screws having external threads with only half threads because of undercuts. The screw structure and elevator of the invention provide for a wide single lead thread. The internal thread of the elevator is one complete revolution which is molded without unscrewing or "popping off." This is accomplished by telescoping two half core pins to meet and form two halves of the thread. The result is a very strong and complete thread that is easier to tool, mold, and maintain without compromising the integrity of the function of thread and, in fact, provides an improved thread structure. The external thread of the screw structure is a matching single lead wide thread. This structure renders a parting line undercut insignificant and allows for the tooling and molding of a complete round thread. "Wide" in reference to the screw thread refers to the thread profile detail being based on evenly spacing the root and crest over a major length of the screw based on the "threads per inch." For example, a 6 threads per inch would result in a wider spaced root and crest than an 8 threads per inch, i.e., 0.075 vs. 0.055 respectively. Preferably, the wide single lead thread has from about 4 to about 10 threads per inch, more preferably from about 5 to about 9 threads per inch, and most preferably from about 6 to about 8 threads per inch.

[0012] A further feature of the invention is to provide a "click" feature in the dispenser which provides a sound and feel to a consumer upon propelling or repelling product within the dispenser. The "click" feature is provided by a screw trigger which involves at least one, preferably two, main extensions or flaps

projecting outward from the screw structure in the lower part of the screw structure above the turn screw, and at least one, preferably a plurality of, mating rib(s) extending inward from a wall surface of the dispenser body, preferably the base wall of the dispenser body. The mating ribs are structured to provide a predetermined amount of pressure and response and are placed in alternate contact between the extension(s) or flap(s) of the "click" feature. Upon rotation of the turn screw to propel or repel the elevator on the screw to dispense or retract product, a consumer will hear, as well as feel, a "click" upon the interaction of the extension(s) or flap(s) with the mating rib(s). Such provides a control for the amount of product dispensed or retracted. Preferably two extensions are used with a plurality of ribs, e.g., 7, so as to provide smaller increments upon which a click is heard and felt. This provides for a greater control of the amount of the product propelled or repelled.

[0013] Another feature of the invention is a screw retention means. Conventional screw retention means are either solid conical structures or multi-segmented structures within the bottom wall of the dispenser body. The retention means of the invention comprises a single slot positioned opposite a gate location in the bottom or base wall of the dispenser body through which the screw structure extends. The single slot provides for flexibility during assembly of the screw in the dispenser body while also maintaining strength to retain the screw in the dispenser body. Situating the single slot opposite the gate optimizes the structure based on the flow of plastic during molding of the dispenser body.

[0014] A primary object of the invention is to provide a propel/repel dispenser having a single lead thread on an internal screw structure.

[0015] Another primary object of the invention is to provide a propel/repel dispenser having a "click" feature which provides sound and feel to a consumer to indicate advance of a product in the dispenser upon propelling or repelling.

[0016] Another primary object of the invention is to provide a propel/repel dispenser having a single slot retention means for holding a screw structure in place in a dispenser body upon assembly.

[0017] These primary and other objects of the invention will be apparent from the following description of the preferred embodiments of the invention and from the accompanying drawings.

BRIEF DESCRIPTION OF DRAWINGS

[0018] FIGURE 1 is a perspective view of a first embodiment of the screw structure with a central upright member with a single lead screw thread of the invention and a turn screw at the base thereof.

[0019] FIGURE 2 is a side view of the first embodiment of the screw structure of FIGURE 1.

[0020] FIGURE 3 is a top view of the screw structure as shown in FIGURE 2.

[0021] FIGURE 4 is a cross-section along line 4-4 of FIGURE 3.

[0022] FIGURE 5 is a perspective view of a second embodiment of the screw structure of the invention including the single lead thread on the central upright member and including two extensions or flaps projecting outward of the central upright member above the turn

screw, wherein the two extensions are a first part of the "click" feature of the invention.

[0023] FIGURE 6 is a top view of the screw structure of FIGURE 5.

[0024] FIGURE 7 is a cross-section of the screw structure of the invention taken along line 7-7 of FIGURE 6.

[0025] FIGURE 8 is a side view of the second embodiment shown in FIGURE 5 showing two extensions of the "click" feature from the side.

[0026] FIGURE 9 is a side view of the screw structure of FIGURE 8 turned 90° to show an extension of the "click" feature from an end view of the extension.

[0027] FIGURE 10 is a perspective view of a third embodiment of the screw structure of the invention including a single lead thread on the central upright member and a turn screw at the base thereof.

[0028] FIGURE 11 is a side view of the third embodiment of the screw structure shown in FIGURE 10.

[0029] FIGURE 12 is a top view of the screw structure as shown in FIGURE 10.

[0030] FIGURE 13 is a cross-section of the screw structure of the invention taken along line 13-13 of FIGURE 12.

[0031] FIGURE 14 is a detail of the circled section of FIGURE 11 showing a widened portion of the screw structure.

[0032] FIGURE 15 is a cross-section of the screw structure of the invention taken along the line 15-15 of FIGURE 11.

[0033] FIGURE 16 is a cross-section of the screw structure of the invention taken along the line 16-16 of FIGURE 11.

[0034] FIGURE 17 is a side view of a fourth embodiment of the screw structure of the invention including a single lead thread on the central upright member and including two extensions projecting outward of the central upright member above the turn screw, wherein the two extensions are a first part of the "click" feature of the invention.

[0035] FIGURE 18 is a top view of the screw structure of FIGURE 17.

[0036] FIGURE 19 is a cross-section of the screw structure of the invention taken along line 19-19 of FIGURE 18.

[0037] FIGURE 20 is a cross-section of the screw structure taken along the line 20-20 of FIGURE 17.

[0038] FIGURE 21 is a detail of the circled section of FIGURE 17 showing a widened portion of the screw structure.

[0039] FIGURE 22 is an exterior front view of the body of the dispenser with phantom lines showing internal structures, including a second part of the "click" feature comprising a plurality of ribs extending inward from an interior wall of the body.

[0040] FIGURE 23 is a cross-section along line 23-23 of FIGURE 22.

[0041] FIGURE 24 is an external side view of the body of the dispenser of FIGURE 22.

[0042] FIGURE 25 is a cross-section along line 25-25 of FIGURE 24.

[0043] FIGURE 26 is a detail showing a bottom view of a single rib of the second part of the "click" feature.

[0044] FIGURE 27 is a detail of the circled section of FIGURE 25 showing a rib of the "click" feature.

[0045] FIGURE 28 is a bottom view of the body of the dispenser showing a single slot extending off a central

opening in the base wall of the body in accordance with the invention, the base wall in conjunction with a retaining means on the screw structure holding the screw structure in place within the body upon assembly.

[0046] FIGURE 29 is a perspective view of a first embodiment of an elevator configured for movement along the screw thread of the invention within an elliptical body of the dispenser.

[0047] FIGURE 30 is a top perspective view of the elevator of FIGURE 29.

[0048] FIGURE 31 is a bottom perspective view of the elevator of FIGURE 29.

[0049] FIGURE 32 is a front view of the exterior of the elevator of FIGURE 29 with phantom lines showing internal structural features.

[0050] FIGURE 33 is a cross-sectional side view taken along line 33-33 of FIGURE 32 showing an internal screw thread which complements the external screw threads of the screw structure of the invention.

[0051] FIGURE 34 is a side view of the exterior of the elevator of FIGURE 29 showing internal structures.

[0052] FIGURE 35 is a cross-sectional view along line 35-35 of FIGURE 34.

[0053] FIGURE 36 is a detail of a rib within the circle of FIGURE 33.

[0054] FIGURE 37 is a detail of a top rim of the elevator within the circle portion of FIGURE 35.

[0055] FIGURE 38 is a first embodiment of a lead screw thread of the screw structure of the invention.

[0056] FIGURE 39 is a top perspective view of a second embodiment of an elevator configured for movement along the screw thread of the invention within an elliptical body of the dispenser.

[0057] FIGURE 40 is a bottom perspective view of the elevator of FIGURE 39.

[0058] FIGURE 41 is a side view of the exterior structure of the elevator of FIGURE 39 showing internal structures.

[0059] FIGURE 42 is a cross-sectional view along line 42-42 of FIGURE 41.

[0060] FIGURE 43 is a second embodiment of a lead screw thread of the screw structure of the invention.

[0061] FIGURE 44 is a bottom perspective view of a third embodiment of an elevator of the invention configured for use in a round dispenser body.

[0062] FIGURE 45 is a top perspective view of the elevator of FIGURE 44.

[0063] FIGURE 46 is a bottom view of the elevator of FIGURE 44.

[0064] FIGURE 47 is a cross-sectional view along line 47-47 of FIGURE 46.

[0065] FIGURE 48 is a cross-sectional view along line 48-48 of FIGURE 46.

[0066] FIGURE 49 is a bottom perspective view of a fourth embodiment of an elevator of the invention configured for use in a round dispenser body.

[0067] FIGURE 50 is a top perspective view of the elevator of FIGURE 49.

[0068] FIGURE 51 is a bottom view of the elevator of FIGURE 49.

[0069] FIGURE 52 is a cross-sectional view along line 52-52 of FIGURE 51.

[0070] FIGURE 53 is a cross-sectional view along line 53-53 of FIGURE 51.

[0071] FIGURE 54 is a detail of a rib within the circle portion of FIGURE 53.

[0072] FIGURE 55 is a perspective view of an assembled elliptical-shaped dispenser of the invention.

[0073] FIGURE 56 is a side view of the dispenser of FIGURE 55 showing direction of assembly of the screw structure and cap on the dispenser body (the elevator is not shown).

[0074] FIGURE 57 is a perspective top view of a cap for attachment to the elliptical body of the dispenser.

[0075] FIGURE 58 is a cross-sectional view of the cap along line 58-58 of FIGURE 57.

[0076] FIGURE 59 is a cross-sectional front view of an assembled dispenser including a body, a screw structure with a single lead thread and two extensions of the "click" feature, an elevator with internal screw threads which complement the external screw threads on the upright member of the screw structure, and a cap.

[0077] FIGURE 60 is a cross-sectional side view of the assembled dispenser as shown from the front in FIGURE 59 wherein ribs of the "click" feature are shown.

DETAILED DESCRIPTION OF THE INVENTION

[0078] The invention is directed to propel/repel dispensers containing one or more features in combination which provide for improved manufacture, dispenser strength and consumer use. The features of the invention include a single lead thread design for an upright member of a screw structure, a "click" feature to provide for improved sound and feel for dispensing and retracting of a product by the consumer, and a screw-retaining feature for holding the screw structure within the dispenser maintaining the strength integrity of the dispenser.

[0079] FIGURES 1-21 show four embodiments of a screw structure 110 for a propel/repel dispenser 100 in accordance with the invention. The structure can be made

of a thermoplastic material, preferably polypropylene. Each of the embodiments illustrated in FIGURES 1-21 include a base turn screw 112 having an upright member 114 extending lengthwise from the center of a top surface of the turn screw. The top portion of the upright member 114 essentially includes a wide single lead thread structure 116, i.e., screw thread, wherein the screw thread provides a complete revolution around the upright member 114.

[0080] The wide single lead thread 116 provides for improvement in the manufacture of the thread with regard to the molding of the structure and ease of removal from a mold. "Wide" in reference to the screw thread refers to the thread profile detail being based on evenly spacing the root and crest over the length of the screw based on the "threads per inch." For example, a 6 threads per inch would result in a wider spaced root and crest than an 8 threads per inch, i.e., 0.075 vs. 0.055, respectively. Preferably, the wide single thread 116 has from about 4 to about 10 threads per inch, more preferably from about 5 to about 9 threads per inch and most preferably from about 6 to about 8 threads per inch. The wide single thread 116 additionally serves to allow for efficient traveling of an elevator along the thread. The screw structure 110 also has a widened portion between the turn screw 112 and the upright member 114, in the base portion of the upright member 114. The widened portion is preferably a locking projection which aids in holding the screw structure 110 inside the body of the dispenser as described in further detail below.

[0081] The screw structure 110 is inserted into a dispenser body 126 and combined with an elevator to form the propel/repel dispenser 100 of the invention as detailed below.

[0082] The elevator as will be described below includes an internal screw thread structure which is complementary to the lead screw thread 116 on the upright member 114.

[0083] In the embodiments shown in FIGURES 5-9 and 17-21, the screw structure 110 additionally includes two flaps or extensions 120,122 projecting from a lower portion of the upright member 114 above the top of the turn screw 112, preferably between the locking projection and the turn screw 112. Two extensions are preferably present although the extensions can be present as one or more. These extensions 120,122 are a first part of the "click" feature of the invention and a plurality of ribs contained on an inner surface wall 126 on the body of the dispenser comprise a second part of the "click" feature as will be further described below.

[0084] FIGURES 22-28 show the body 126 of the dispenser of the invention, including the second part of the "click" feature of the invention, i.e., the ribs 132.

[0085] FIGURE 22 shows a front exterior view of the body 126 of a preferred embodiment of the dispenser having an elliptical shape and FIGURE 24 shows the body 126 from a side exterior view. FIGURE 23 shows a cross-section along line 23-23 of FIGURE 22 and FIGURE 25 shows a cross-section along line 25-25 of FIGURE 24 showing the placement of a plurality of ribs 132 in the bottom portion of the body 126. FIGURE 26 shows a detail of a rib 132 projecting from an interior surface wall of the body 126. FIGURE 27 shows a detail within the circle portion of FIGURE 25 of a rib 132 extending inward from an interior wall surface of body 126. When the screw structure 110 is inserted through an opening 138 in the bottom or base wall 136 of the body 126 as illustrated in FIGURE 56, the extensions 120,122 of the screw structure

110 will be at approximately the same level or in about the same plane as the plurality of ribs 132 (see FIGURES 59 and 60 showing the dispenser assembled).

[0086] Accordingly, when the turn screw 112 is rotated to propel or retract product from the body of the dispenser, the extensions 120,122 on the turn screw 112 will rotate past the one or more of the plurality of ribs 132 and upon passing provide for a clicking sound and feel. A consumer, based upon the clicking will be able to control by sound and feel the amount of product propelled or retracted with greater accuracy. The ribs 132 are provided with a sufficient amount of pressure and response so as to provide feel as well as sound.

[0087] FIGURE 28 shows the bottom or base wall 136 contained in the body 126 as viewed from the bottom of the body 126. The base wall 136 includes a central opening 138 having a single slot 140 extending from the opening 138. Accordingly, when the screw structure 110 is inserted through the bottom of the body 126, the screw structure 110 passes through the opening 138 in the base wall 136 into the body 126 of the dispenser. The single slot 140 provides sufficient flexibility in the base wall 136 to allow for the passing through of the widened portion of the screw structure 110 which will serve to hold the screw structure 110 in place in the body 126 once the screw structure 110 passes through the opening 138 in the base wall 136. The circumference of the widened portion of the screw structure is greater in size than the size of the opening 138 in absence of the slot 140. The single slot 140, however, also allows for the maintenance of strength and integrity to the base wall 136 of the body 126.

[0088] Conventional screw retention features generally have either a solid conical design or a multi-segmented

design. The solid conical design requires added pressure upon assembly to insert the screw structure into the body and/or smaller locking structures on the screw structure in order to allow the screw structure to pass through the central opening of an unbroken base wall. A conventional multi-segmented design allows for an easier pass through of the screw structure but also results in a weaker base wall.

[0089] A locking projection of the present invention on the screw structure 110 is shown in FIGURES 1-21 in the various embodiments of the screw structure 110. In the embodiments of FIGURES 1-4 and 10-16, the locking projection is a retention means 142 which is a projection in the lower portion of the upright member 114 having an inclined face 144 to ease onset of the pass through of the screw structure 110 through the central opening 138 of the base wall 136. The inclined face is thus angled downward in relation to the upright member of the screw structure. The bottom 146 of the retention means 142 is essentially perpendicular to the upright member 114 and sits on top the base wall 136 of the body 126 once the screw structure 110 is in place in the body 126. In the embodiments of FIGURES 5-9 and 17-21, the retention means 142 is similar in structure in that the retention means 142 has an inclined upper face 144 and a flat bottom wall 146.

[0090] The embodiments of the screw structure 110 in FIGURES 5-9 and 17-21 also have extensions 120,122 as detailed above. The extensions 120,122 project from the lower portion of the upright member 114 preferably between the retention means 142 and the turn screw 112.

[0091] FIGURES 29-37, 39-42 and 44-54 illustrate various embodiments of the elevator of the invention useful with the screw structure 110 including the single

lead thread of the invention. FIGURES 29-37 and 39-42 illustrate embodiments of an elevator suitable for use in a dispensing body having an elliptical shape. FIGURES 44-54 illustrate another embodiment of an elevator useful in a dispensing body having a round shape.

[0092] With regard to a first embodiment of the elevator, FIGURE 29 shows a perspective top view of the elevator 150 having an elliptical shape and suitable for use in a dispensing body having an elliptical shape. FIGURE 30 shows a top perspective view of the elevator 150 of FIGURE 29. FIGURE 31 shows a bottom perspective view of the first embodiment of the elevator of FIGURE 29. FIGURE 32 shows a front exterior view of the first embodiment of the elevator 150 of FIGURE 29. FIGURE 33 shows a cross-section of the first embodiment of the elevator 150 along line 33-33 of FIGURE 32 showing in further detail the central portion 152 containing an internal screw thread 154 which complements and thereby is able to receive the external screw thread/single lead thread 116 of the upright member 114 of the screw structure 110. FIGURE 34 shows a side exterior view of the first embodiment of the elevator 150 of FIGURE 29 including dotted lines showing interior structure thereof. FIGURE 35 shows a cross-section of the first embodiment of the elevator 150 along line 35-35 of FIGURE 34 showing in further detail the central portion 152 containing the internal screw thread 154 which complements and is thereby able to receive the single lead thread 116 of the upright member 114 of the screw structure 110. FIGURE 36 illustrates a detail of a widthwise internal projection 156 shown within the circled portion of FIGURE 33. The projections 156 provide structure for holding product in place within the elevator 150 once the dispenser body 126 is filled with

product. FIGURE 37 shows a detail of a top edge 157 of the elevator 150 shown in the circle portion of FIGURE 35. The top edge 157 preferably is angled outward to provide for a wiper seal against the interior wall of the body 126 of the dispenser in order to prevent product from going between the outside of the elevator and the inner wall of the body.

[0093] In the first embodiment of the elevator 150, the internal screw thread 154 has a leading edge 153 which is a flat straight edge, as shown for example in FIGURES 30 and 31.

[0094] Any suitable screw structure 110 having a suitable lead screw thread 116 on the upright member 114 may be used with the elevator 150 shown in FIGURES 29-37. However, a preferred screw structure 110 has a lead screw thread 116 with a leading edge 117 that is a flat straight edge, as shown for example in FIGURE 38. The flat straight leading edge 117 of the lead screw thread 116 corresponds to the flat straight leading edge 153 of the internal screw thread 154 to provide engagement of the threads.

[0095] FIGURE 39 shows a top perspective view of a second embodiment of the elevator 150. FIGURE 40 shows a bottom perspective view of the second embodiment of the elevator 150 of FIGURE 39. FIGURE 41 shows a side exterior view of the second embodiment of the elevator 150 of FIGURE 39 including dotted lines showing interior structure thereof. FIGURE 42 shows a cross-section of the second embodiment of the elevator 150 showing in further detail the central portion 152 containing the internal screw thread 154 which complements and is thereby able to receive the single thread 116 of the upright member 114 of the screw structure 110.

[0096] In the second embodiment of the elevator 150, the internal screw thread 154 has a leading edge 153' which is an angled edge, as shown for example in FIGURES 39, 40 and 42.

[0097] Any suitable screw structure 110 having a suitable lead screw thread 116 on the upright member 114 may be used with the elevator 150 shown in FIGURES 39-42. However, a preferred screw structure 110 has a lead screw thread 116 with a leading edge 117' that is an angled edge, as shown for example in FIGURE 43. The angled leading edge 117' of the lead screw thread 116 corresponds to the angled edge 153' of the internal screw thread 154 to provide engagement of the threads. Also, the angled leading edges 117', 153' improve the initial engagement of both threads.

[0098] The embodiments of the elevator 150 as shown in FIGURES 39-42 also preferably comprise at least one widthwise internal projection 156 to provide for structure for holding the product in place within the elevator 150 once the dispenser body 126 is filled with product.

[0099] FIGURE 44 shows a perspective bottom view of an embodiment of an elevator 160 useful in a dispensing body having a round shape. FIGURE 45 shows a perspective top view of the elevator 160 of FIGURE 44. FIGURE 46 shows a bottom view of the elevator 160 of FIGURE 44. FIGURE 47 shows a cross-section of the elevator 160 along line 47-47 of FIGURE 46 showing in further detail the central portion 152 containing an internal screw thread 168. FIGURE 48 shows a cross-section of the elevator 160 along line 48-48 of FIGURE 46 showing in further detail the central portion 152 containing the internal screw thread 168. In this embodiment, the elevator 160 has a central opening 164 leading to a passage 166 containing internal

screw thread 168 complementary to the external screw thread 116 of the upright member 114. The internal screw thread 168 has a leading edge 163 which is a flat straight edge as described above. Alternatively, the leading edge can be angled as described above in relation to the embodiment of FIGURES 42 and 43.

[00100] FIGURE 49 shows a perspective bottom view of another embodiment of an elevator 160 having a round shape. FIGURE 50 shows a perspective top view of the elevator 160 of FIGURE 49. FIGURE 51 shows a bottom view of the elevator 160 of FIGURE 49. FIGURE 52 shows a cross-section of the elevator 160 along line 52-52 of FIGURE 51 showing in further detail the central portion 152 containing an internal screw thread 168. FIGURE 53 shows a cross-section of the elevator 160 along line 53-53 of FIGURE 51 showing in further detail the central portion 152 containing an internal screw thread 168. FIGURE 54 shows a detail of a widthwise internal projection 156 shown within the circled portion of FIGURE 53. The projections 156 provide for holding the product in place within the elevator 160 once the dispenser is filled with product.

[00101] In this embodiment, the elevator 160 has a central opening 164 leading to a passage 166 containing internal screw threads 168 complementary to the external screw threads 116 of the upright member 114. The internal screw 168 has a leading edge 163' which is preferably an angled leading edge as described above.

[00102] The central opening 164 in the base of the elevator 160 has a single slot 140 extending from the opening 164. This slot configuration provides sufficient flexibility in the base wall 165 of the elevator to allow for mating of the widened portion of the screw structure 110 which will serve to hold the screw structure 110 in

relation to the elevator once the screw structure 110 passes through the opening 138 of the base wall 136 as described above.

[00103] The embodiments of the elevator 150 can have smooth exterior side walls as shown in FIGURES 29-37 and 39-42 or the elevator 160 as shown for example in FIGURES 44-54 can have a plurality of ribs 162 along the side wall. In the embodiment of FIGURES 29-37 and 39-42, no ribs are required due to the shape, i.e., elliptical shape, of the elevator 150 and the dispenser body. Upon rotation of the turn screw to propel or repel product, the elevator 150 is incapable of rotating within the body and thus travels along the upright member 114 of the screw structure 110.

[00104] In the embodiment of FIGURES 44-54, ribs 162 are present on the exterior wall of the elevator 160 and additional ribs are preferably present on the inner side wall of the dispenser to prevent the elevator 160 from spinning within the body of the dispenser upon rotation of the turn screw 112.

[00105] As shown by the different embodiments of FIGURES 29-37, 39-42 and 44-54, the internal screw thread portion of the elevator can pass through the entire length of the elevator as shown in the embodiments of FIGURES 29-37 and 39-42, or extend through only a portion of the length of the elevator as shown in the embodiments of FIGURES 44-54.

[00106] FIGURES 55 and 56 show an example of a dispenser 100 of the invention. In FIGURES 55 and 56, and other figures herein, the body 126 of the dispenser 100 is shown as having an elliptical shape. Necessarily the body can be of other shapes, such as a conventional round body. FIGURE 55 is a perspective view of an assembled dispenser 100 having a screw structure inserted

therein and showing the placement of the turn screw 112 therein upon assembly. A cap 128 is present on the top open end 130 of the body 126. FIGURE 56 illustrates the direction of assembly between the screw structure 110, dispensing body 126 and cap 128. The dispensing body 126 preferably includes an inset top wall portion 170 with a shoulder 172 for receiving a cap 128 thereon so that side walls of the cap provide for a unitary smooth exterior surface. The elevator is not shown in FIGURE 56.

[00107] When the screw structure 110 is inserted into the bottom of the body 126 as illustrated in FIGURE 56, the extensions of the screw structure 110 will be at approximately the same level or in about the same plane as the plurality of ribs 132 (see FIGURES 59 and 60 showing the dispenser assembled).

[00108] FIGURES 57 and 58 illustrate a cap 128 suitable for use with respect to the embodiment of the invention utilizing a elliptically shaped dispenser body. Necessarily when a differently shaped body is utilized, a different shaped cap will be utilized.

[00109] FIGURES 59 and 60 show a cross-sectional view from the front and from the side, respectively, of a dispenser 100 of the invention in assembled form. The dispenser 100 includes the body 126 having a cap 128 thereof, and a screw structure 110 inserted through the base of the body 126. An elevator 150 is positioned on the upright member 114 of the screw structure 110. The dispensing body 126 includes, preferably, an inset top wall portion 170 with a shoulder 172 for receiving the cap 128 thereon so that the side walls of the cap provide for a unitary smooth exterior surface. However, any suitable cap may be used and the top portion of the dispenser may be configured for receiving the cap. FIGURE 59 also shows two extensions 120, 122 in the lower portion

of the screw structure 110 above the turn screw 112.

FIGURE 60 also shows ribs 132 on the interior wall of the body 126 with which the extensions 120,122 interact to provide the "click" feature of the invention.

[00110] Each part of the dispenser 100 of the invention is preferably made of a thermoplastic material, most preferably polypropylene. However, any suitable material may be used.

[00111] As will be apparent to one skilled in the art, various modifications can be made within the scope of the aforesaid description. Such modifications being within the ability of one skilled in the art form a part of the present invention and are embraced by the appended claims.

IT IS CLAIMED:

1. A one piece screw structure for a propel/repel dispenser comprising a turn screw portion having an upright member extending from a center area of a flat side of the turn screw, said upright member having extending lengthwise over a major portion thereof a single lead thread extending circumferentially around the upright member, said single lead thread having a width which provides from about 4 to about 10 threads per inch.

2. The one piece screw structure of claim 1, wherein said single lead thread has a leading edge which is a flat straight edge.

3. The one piece screw structure of claim 1, wherein said single lead thread has a leading edge which is an angled edge.

4. The one piece screw structure of claim 1, wherein said single lead thread has from about 5 to about 9 threads per inch.

5. The one piece screw structure of claim 1, wherein said single lead thread has from about 6 to about 8 threads per inch.

6. The one piece screw structure of claim 1, further comprising a retaining portion, wherein said retaining portion is present on a lower portion of the upright member and has a top surface which is angled downward in relation to said upright member and a bottom surface which is substantially perpendicular to the upright member.

7. A one piece screw structure for a propel/repel dispenser comprising a turn screw portion having an upright member extending upward from a center area of a flat side of the turn screw, said upright member being screw threaded over a major portion of the upright member, and at least one extension projecting from a bottom portion of the upright member, said at least one extension being of a length sufficient to interact with at least one rib present on a wall of a dispenser body when said screw structure is operatively present therein.

8. The one piece screw structure of claim 7, wherein said screw threaded upright member has a single lead thread extending circumferentially around the upright member.

9. The one piece screw structure of claim 8, wherein said single lead thread has a leading edge which is a flat straight edge.

10. The one piece screw structure of claim 8, wherein said single lead thread has a leading edge which is an angled edge.

11. The one piece screw structure of claim 8, wherein said single lead thread has a width which provides from about 4 to about 10 threads per inch.

12. The one piece screw structure of claim 8, wherein said single lead thread has a width which provides from about 6 to about 8 threads per inch.

13. The one piece screw structure of claim 7, wherein said at least one extension is substantially perpendicular to said upright member.

14. The one piece screw structure of claim 7, further comprising a retaining portion, wherein said retaining portion is present on a lower portion of the upright member and has a top surface which is angled downward in relation to said upright member and a bottom surface which is substantially perpendicular to the upright member.

15. A propel/repel dispenser body comprising a base wall for receiving a screw structure, wherein said base wall has a central opening therein and a single slot which is integral with and extends from the central opening, wherein said screw structure includes a retaining portion having a circumference greater in size than the central opening in absence of the slot.

16. The propel/repel dispenser body of claim 15, wherein said single slot provides sufficient flexibility in the base wall to allow for passage through of the retaining portion of the screw structure.

17. The propel/repel dispenser body of claim 15, wherein said dispenser body is elliptical or round in shape.

18. The propel/repel dispenser body of claim 15, further comprising at least one rib extending outward from an interior wall of the body and being of a length sufficient to interact with at least one extension

present on a screw structure when said screw structure is operatively present in said body.

19. A propel/repel dispenser body comprising a base wall with a central opening, said base wall extending between internal side walls of the body and being recessed in said body in relation to an end wall of the body, and at least one rib extending outward from an interior wall of the body and being of a length sufficient to interact with at least one extension present on a screw structure when said screw structure is operatively present in said body.

20. The propel/repel dispenser body of claim 19, wherein said central opening includes a single slot integral with and extending from the central opening.

21. The propel/repel dispenser body of claim 20, wherein said single slot provides sufficient flexibility in the base wall to allow for passage through of a retaining portion of the screw structure, said retaining portion having a circumference greater in size than the central opening in absence of the slot.

22. The propel/repel dispenser body of claim 19, wherein said dispenser body is elliptical or round in shape.

23. A propel/repel dispenser comprising:
— a dispenser body comprising side walls, a base wall for receiving a screw structure wherein said base wall has a central opening therein including a single slot integral with and extending from the central

opening, and at least one rib extending from an interior wall of said body;

- a screw structure including a turn screw portion having an upright member extending therefrom, said upright member having extending lengthwise over a major portion of the upright member a single lead thread extending circumferentially around the upright member, and at least one extension projecting outward from a bottom portion of the upright member below a retaining portion, said at least one extension being of a length sufficient to interact with said at least one rib when said screw structure is operatively present in said dispenser body to provide clicking upon rotation of the turn screw portion; and

- an elevator having an internal screw structure complementary to the single lead thread of the screw structure to provide up or down movement of the elevator along the upright member upon rotation of the turn screw portion.

24. The propel/repel dispenser of claim 23, wherein said single lead thread has a leading edge which is a flat straight edge.

25. The propel/repel dispenser of claim 23, wherein said single lead thread has a leading edge which is an angled edge.

26. The propel/repel dispenser of claim 23, wherein said single lead thread has from about 4 to about 10 threads per inch.

27. The propel/repel dispenser of claim 23, wherein said single lead thread has from about 6 to about 8 threads per inch.

28. The propel/repel dispenser of claim 23, wherein said at least one extension is substantially perpendicular to said upright member.

29. The propel/repel dispenser of claim 23, wherein said single slot provides sufficient flexibility in the base wall to allow for passage through of the retaining portion of the screw structure, said retaining portion having a circumference greater in size than the central opening in absence of the slot.

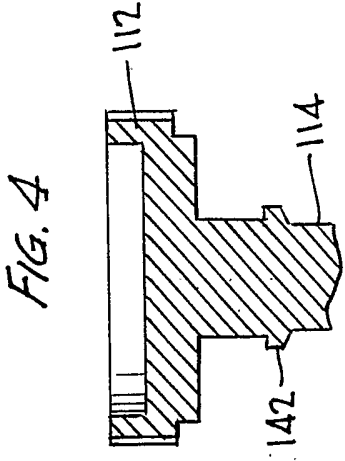
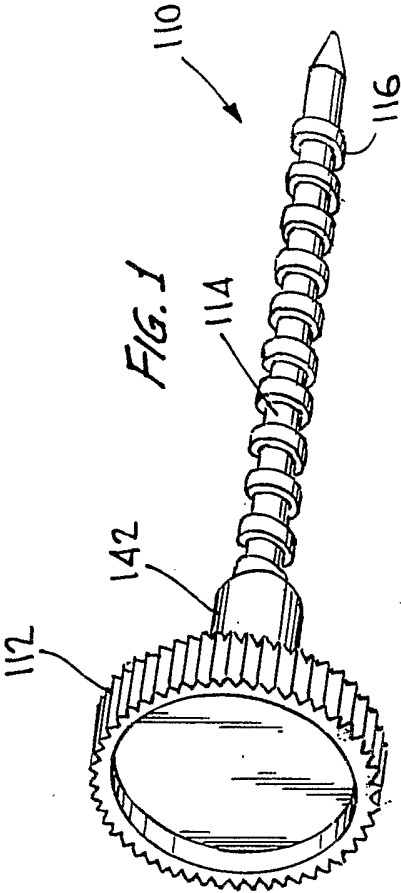
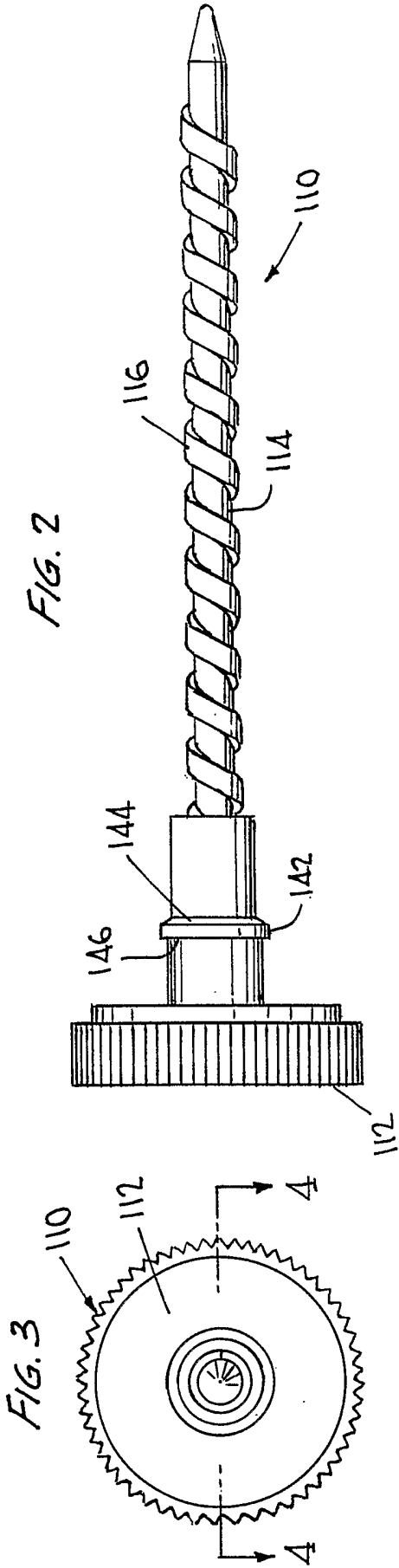
30. The propel/repel dispenser of claim 29, wherein said retaining portion is a projection in the bottom portion of the upright member having a top surface which is angled downward in relation to said upright member and a bottom surface which is substantially perpendicular to the upright member.

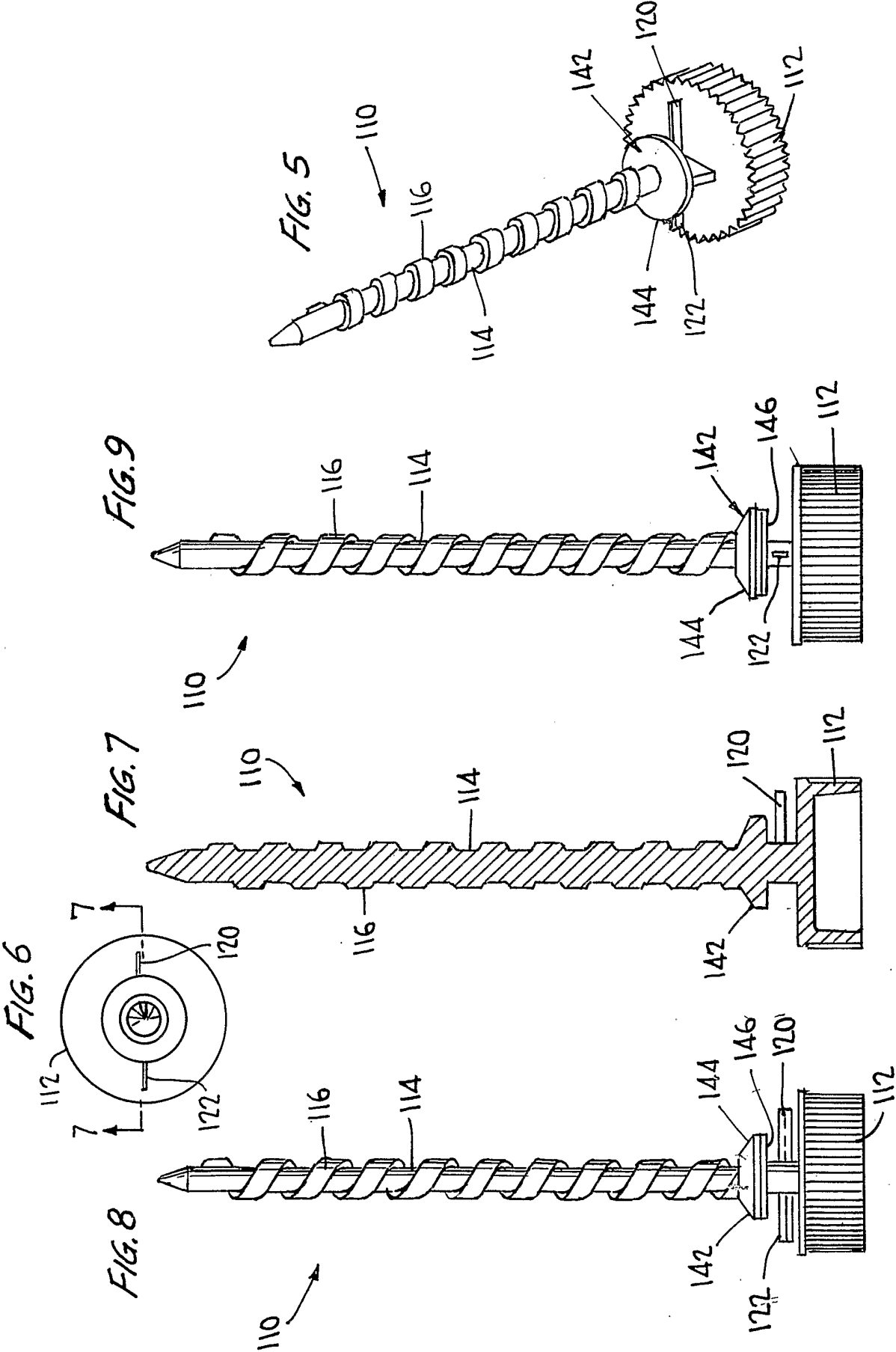
31. The propel/repel dispenser of claim 23, wherein said dispenser body is elliptical or round in shape.

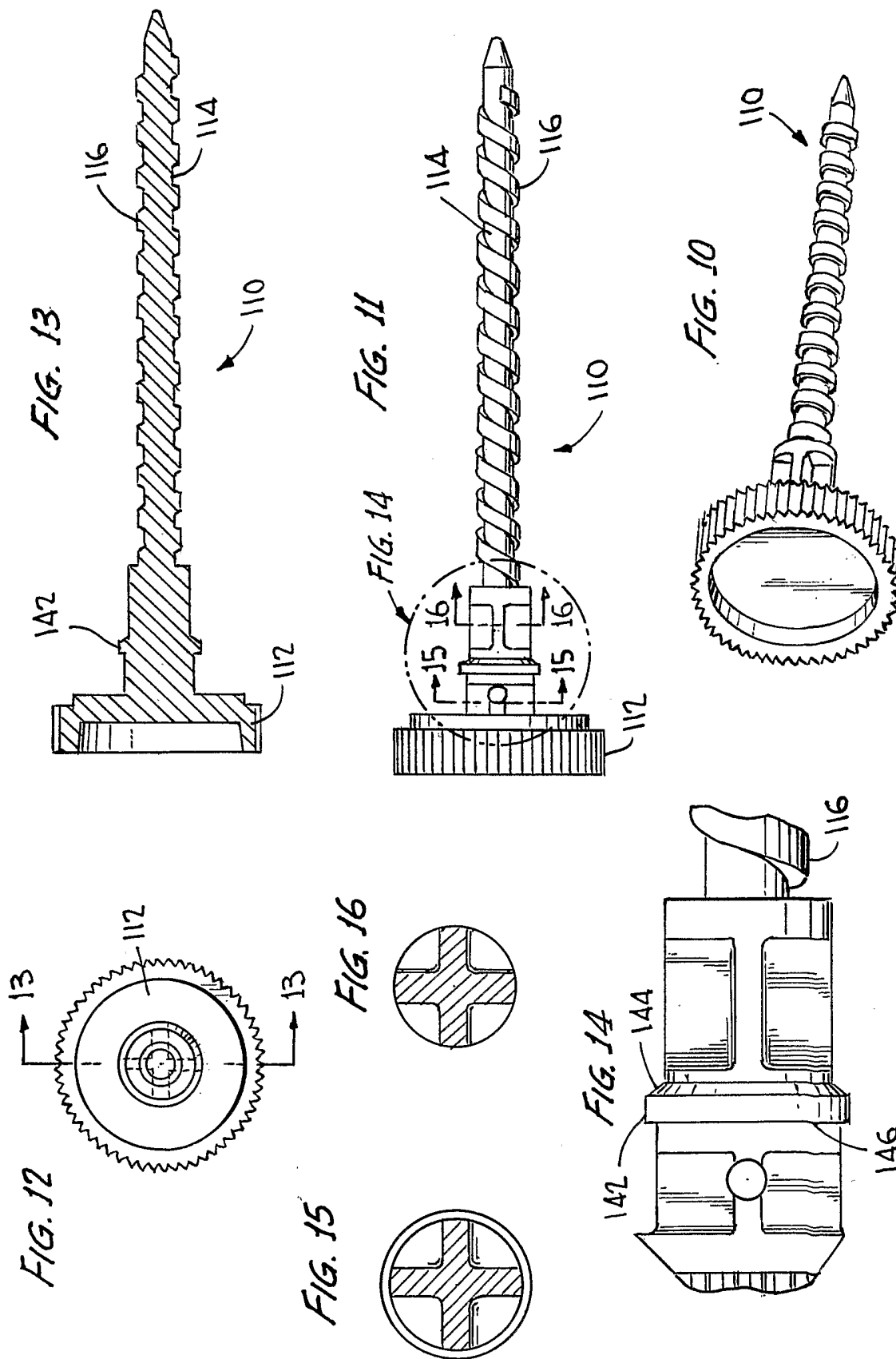
32. The propel/repel dispenser of claim 31, wherein said elevator has a shape which is complementary to the elliptical or round shape of said dispenser body.

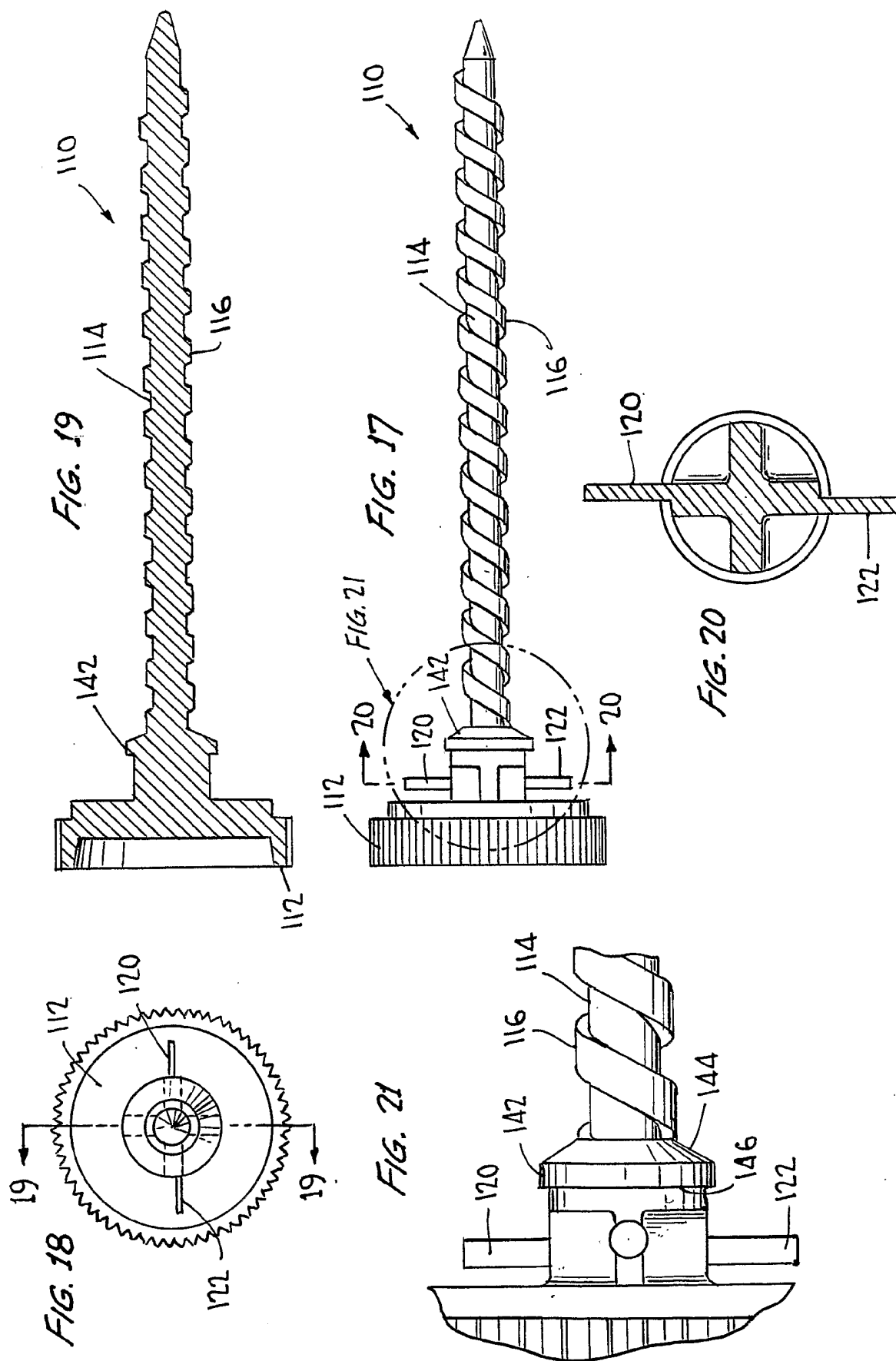
33. The propel/repel dispenser of claim 24, wherein said internal screw structure of said elevator has a leading edge which is a flat straight edge.

34. The propel/repel dispenser of claim 25, wherein said internal screw structure of said elevator has a leading edge which is an angled edge.









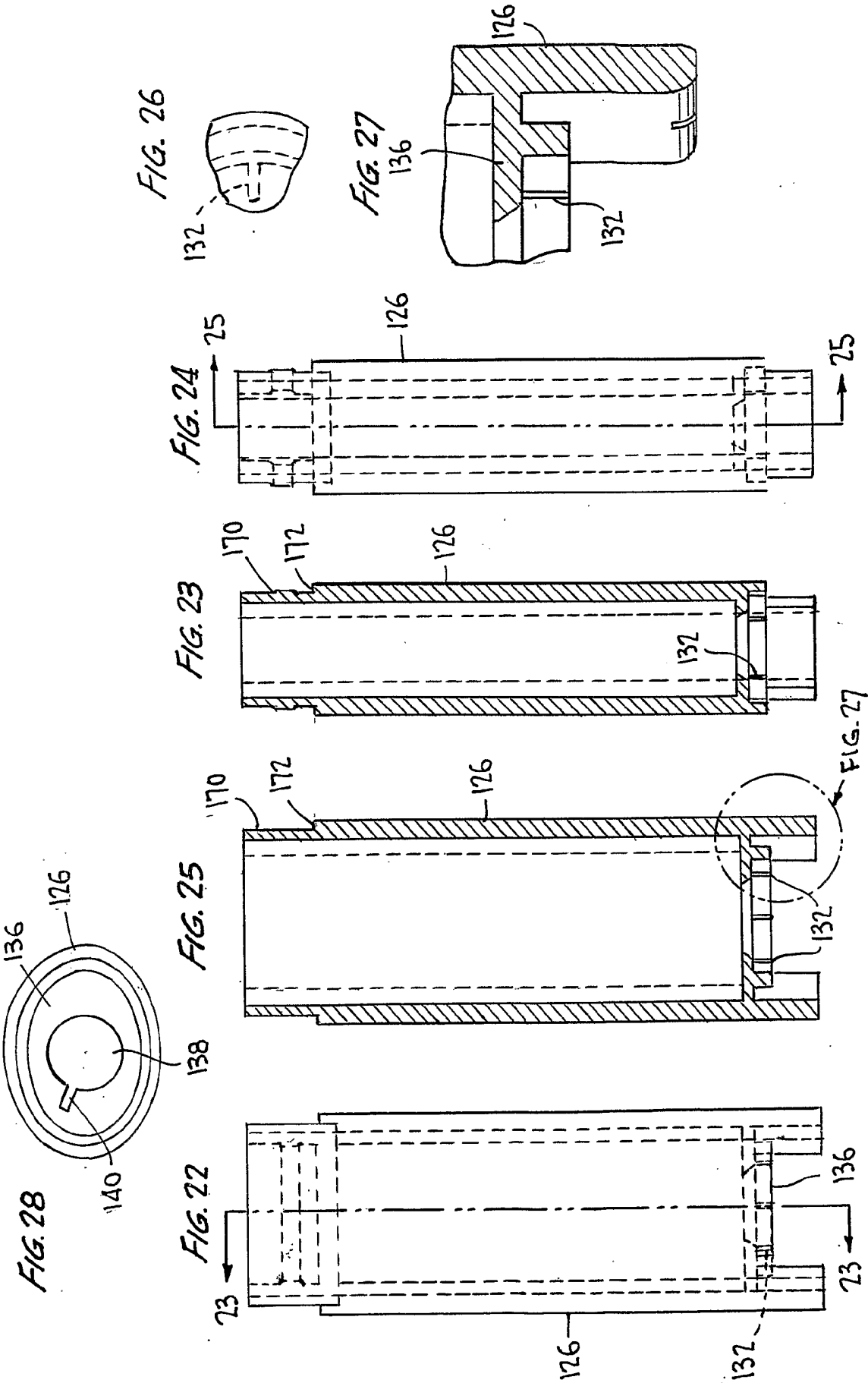


FIG. 30

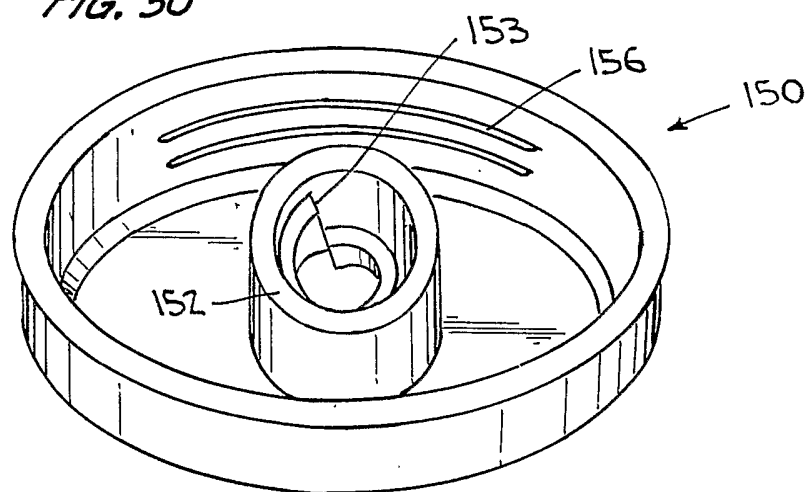


FIG. 31

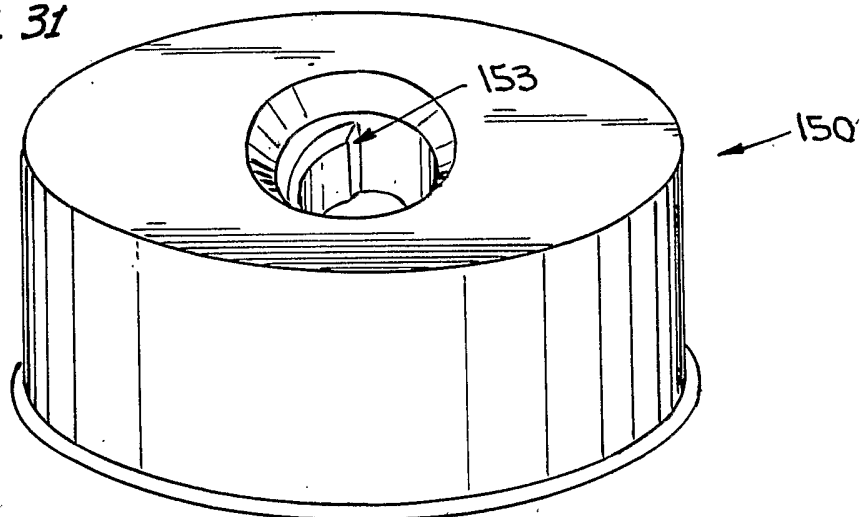


FIG. 38

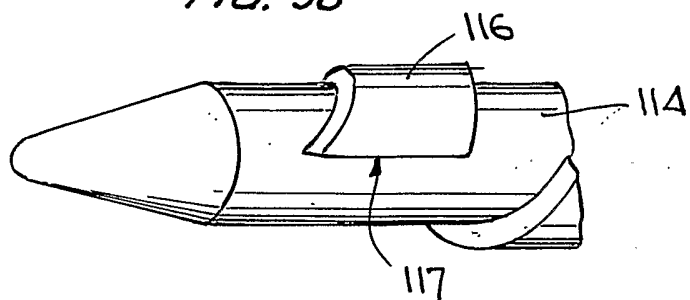


FIG. 36

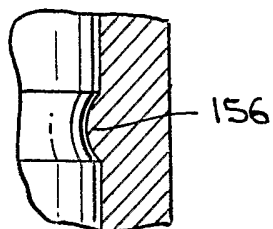


FIG. 29

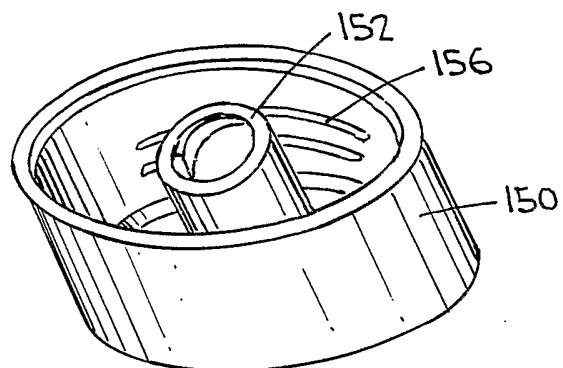


FIG. 32

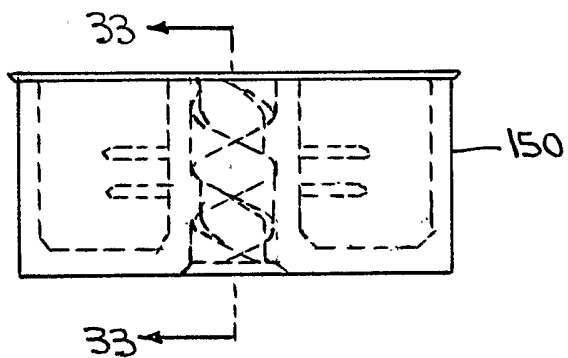


FIG. 33

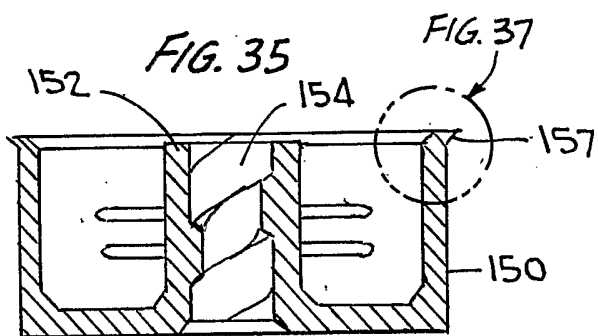
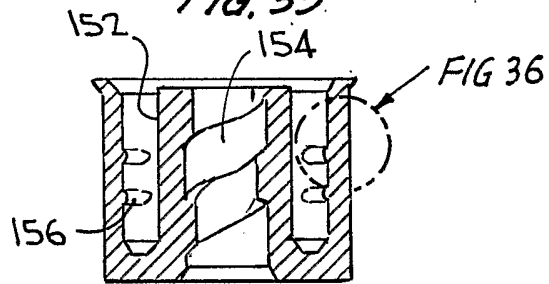


FIG. 34

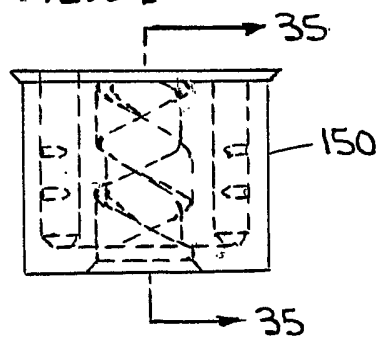


FIG. 37

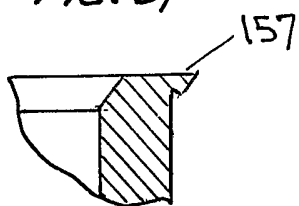


FIG. 41

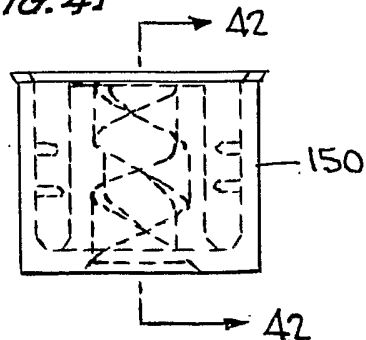


FIG. 39

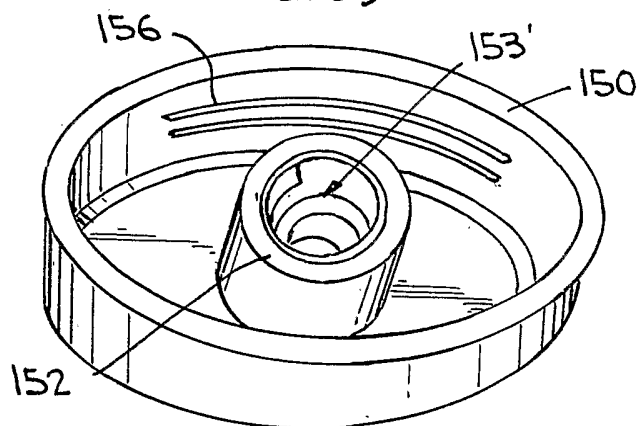


FIG. 40

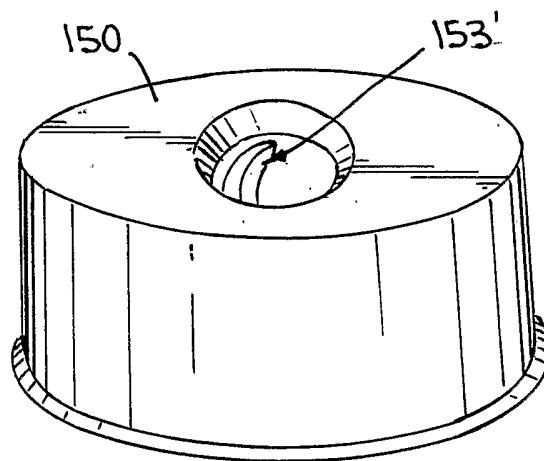


FIG. 42

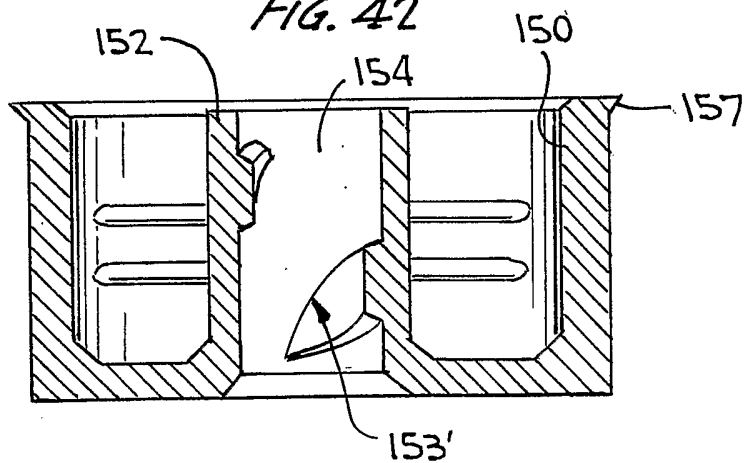


FIG. 43

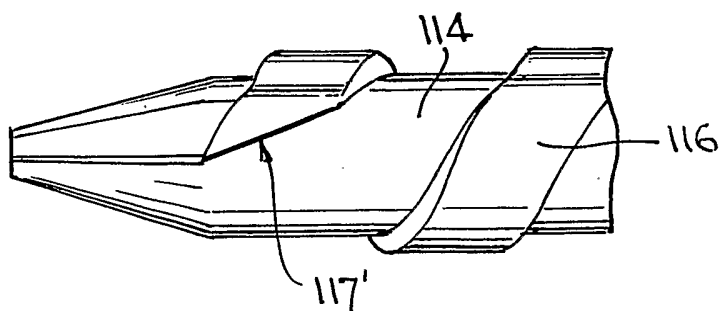


FIG. 46

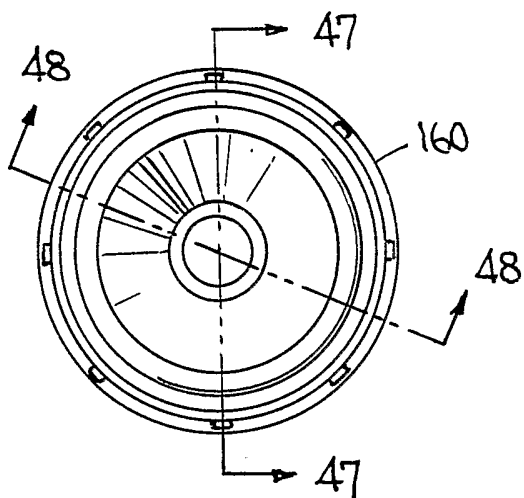


FIG. 47

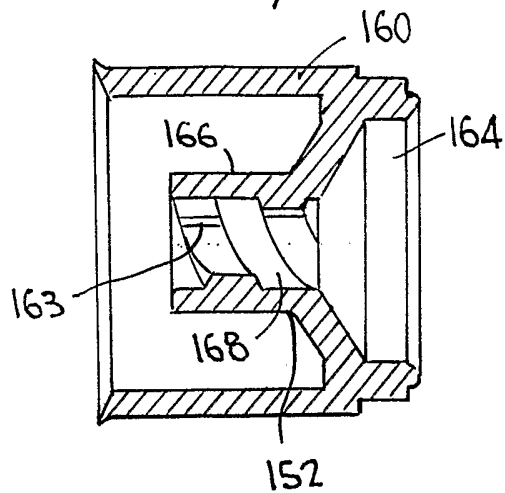


FIG. 48

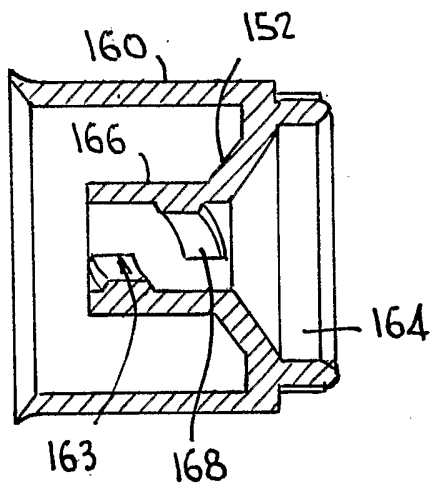


FIG. 44

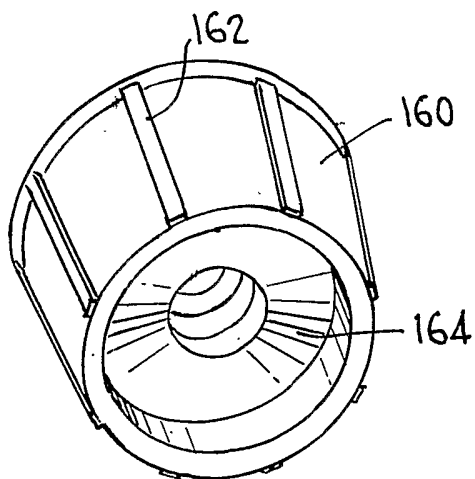


FIG. 45

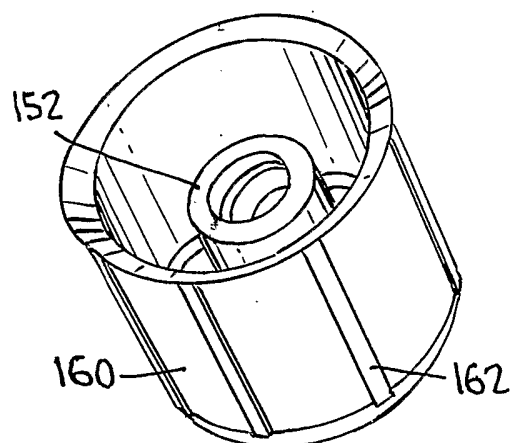


FIG. 52

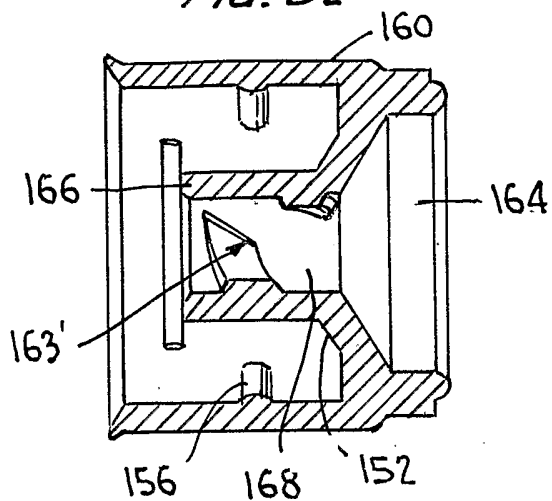


FIG. 51

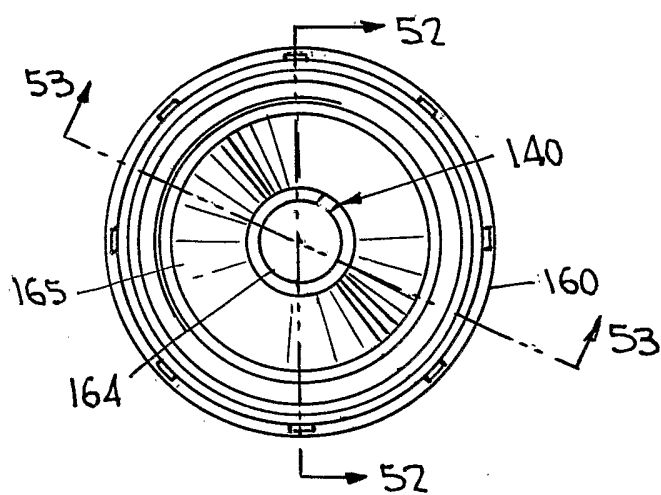


FIG. 53

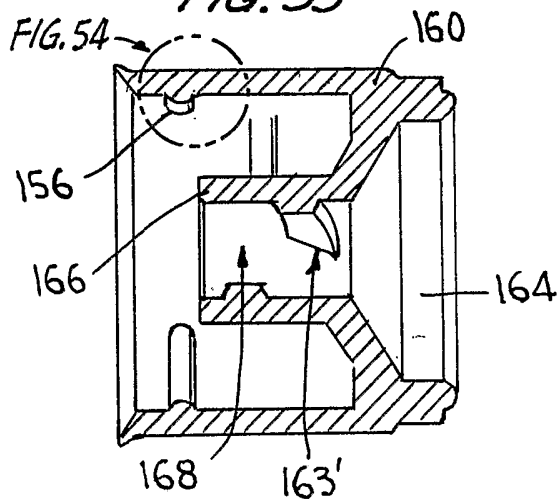


FIG. 54

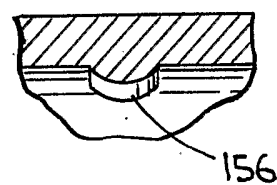


FIG. 49

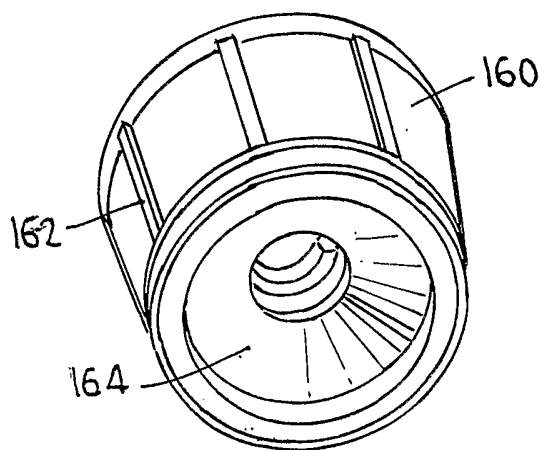
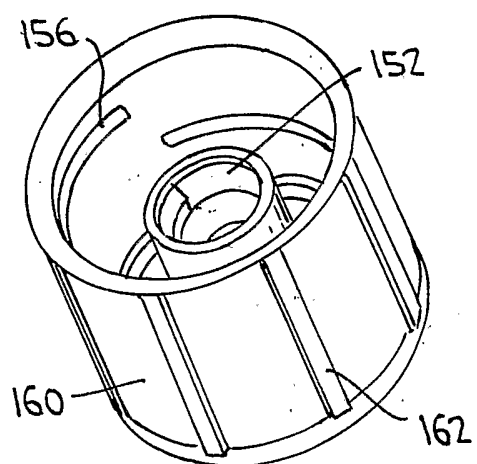


FIG. 50



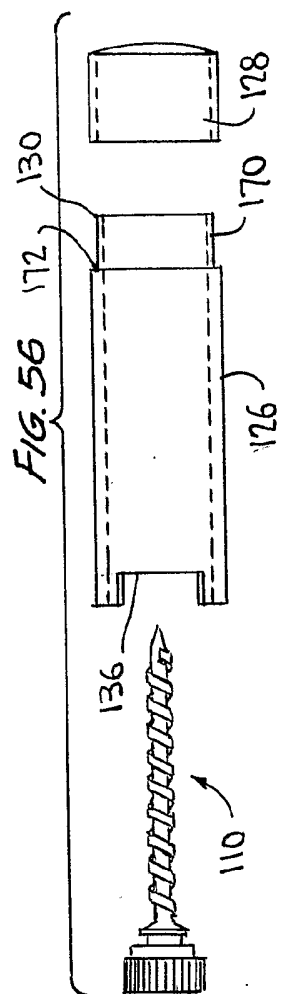


FIG. 55

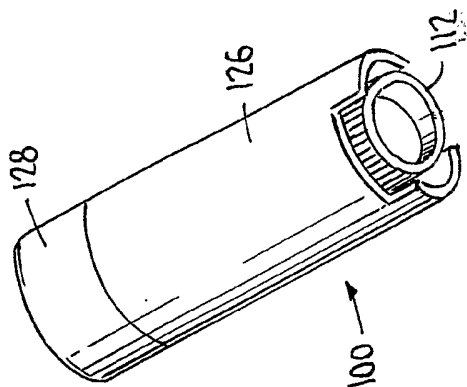


FIG. 58

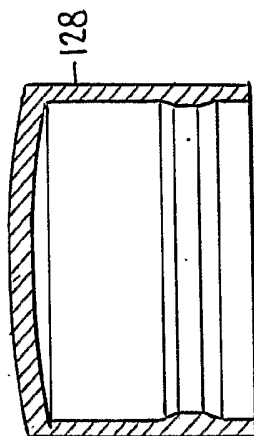


FIG. 57

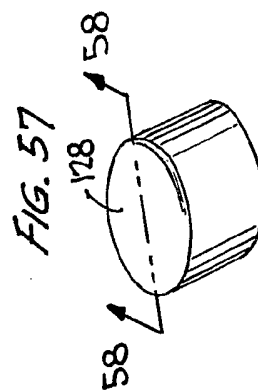


FIG. 60

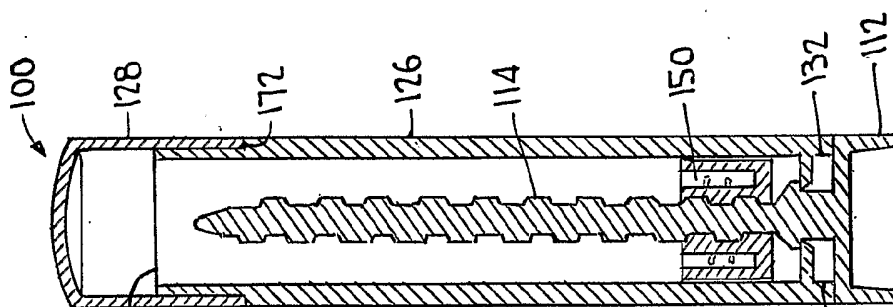


FIG. 59

